Response to Comments on the *Draft Interim Remedial Action Completion Report, Parcel C Remedial Action, Remedial Units C1, C4, and C5, and Building 241 (Excludes C2), Hunters Point Naval Shipyard, San Francisco, California,* February 2017, DCN: CBI-0807-0008-0622	
Comments by: Judy Huang, Remedial Project Manager, EPA, comments dated April 17, 2017	
General Comments	**Response**
1. To assist the reader in better understanding of the overall cleanup progress at Parcel C, please provide a table detailing the cleanup status by remedial unit, media and sub area for the entire Parcel C in the Executive Summary or the Site Background section.	This interim RACR presents the cleanup status by remedial unit, media, and subarea for the RU-C1, C4, C5 and Building 241 Area (excludes RU-C2) consistent with the RAWP (CB&I, 2013), and references other on-going RA activities in the Executive Summary. The Final RACR for Parcel C will provide a table detailing the cleanup status for the entire parcel in accordance with the Parcel C ROD (Navy, 2010).
2. It appears that the decision to transition to long-term monitoring is premature for some of the groundwater plumes. According to Section 1 0.1.2 (Groundwater Treatment Areas), "[G]roundwater treatment criteria were met in accordance with the Final ROD (Navy, 2010) and the RIP [Remedy in Place] milestone has been achieved at Plumes C1-2, C1-4, C4-1, C5-2, C5-3, and C5-4. These groundwater treatment areas, along with Plume C5-5 where contaminant concentrations were reduced to just above ISB [in-situ bioremediation] treatment criteria, will move into the MNA [monitored natural attenuation] phase and continue to be monitored under the basewide groundwater monitoring program." However, the conclusion that these plumes can be moved to the MNA phase and be monitored under the basewide groundwater monitoring program is based on limited performance monitoring. As a result, it is unclear if sufficient time was provided for the zero valent iron (ZVI) and ISB treatment amendment (e.g., 2-3 years for micro-scale ZVI) to be consumed such that a period of long-term monitoring to evaluate potential rebound and MNA can begin. Based on Section 8.5 (In Situ Bioremediation and Zero-Valent Iron Post-Injection Performance Monitoring) of the Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C4, and C5, and Building 241 (Excludes C2), Hunters Point Naval Shipyard, San Francisco, California, dated August 2013 (Final RA WP), a period of long-term monitoring to evaluate potential rebound and MNA can begin if chlorinated volatile organic compound (CVOC) concentrations in the treatment areas are reduced below the ISB treatment criteria. However, it remains unclear if data from such a limited data set collected over 6 to 12.5 months (e.g., three monitoring events at Plumes C5-3, C5-4, and C-5-5) is sufficient to support a transition to long-term monitoring. For example, a. **Plume C1-2:** Based on Table 5-2 (Analytical Results for Groundwater at Plume C1- 2), the conclusion to move Plume C1-2 to the MNA phase is based on eight monitoring events which occurred within 321 days following injection activities. b. **Plume C1-4:** Based on Table 5-3 (Analytical Results for Groundwater at Plume C1- 4), the conclusion to move Plume C1-4 to the MNA phase is based on nine monitoring events which occurred with 318 days following injection activities. c. **Plume C4-1:** Based on Table 5-4 (Analytical Results for Groundwater at Plume C4- 1), the conclusion to move Plume C4-1 to the MNA phase is based on eight monitoring events which occurred with 379 days following injection activities. d. **Plume C5-2:** Based on Table 5-6 (Analytical Results for Groundwater at Plume C5-2), the conclusion to move Plume C5-2 to the MNA phase is based on eight monitoring events which occurred with 323 days following injection activities. e. **Plume C5-3:** Based on Table 5-9 (Analytical Results for Groundwater at Plume C5-3), the conclusion to move Plume C5-3 to the MNA phase is based on three monitoring events which occurred with 183 days following injection activities. f. **Plume C5-4:** Based on Table 5-10 (Analytical Results for Groundwater at Plume C5-4), the conclusion to move Plume C5-4 to the MNA phase is based on three monitoring events which occurred with 182 days following injection activities. g. **Plume C5-5:** Based on Table 5-11 (Analytical Results for Groundwater at Plume C5-5), the conclusion to move Plume C5-5 to the MNA phase is based on three monitoring events which occurred with 181 days following injection activities. It should be noted that the August 17, 2016 1,4-dichlorobenzene concentration at	As described in Section 10.0, the Navy will continue to monitor the referenced groundwater plumes in Parcel C as part of the on-going basewide groundwater monitoring program as well as during other planned RAs to be conducted under separate Work Plans. The additional groundwater data will be presented to the BCT in accordance with the approved documents (ROD, RAWP, BGMP SAP).

IR25MW64A in Plume C5-5 exceeds the ZVI or ISB treatment criteria despite the recommendation to transition to the MNA phase. This is of particular concern given the rainfall events experienced in San Francisco during January/February 2017 (9.42 inches/7.60 inches) and the potential for matrix back diffusion, dilution of treatment amendments, changes in water quality parameters, and rebound. Please revise the I-RACR to discuss why the data from the monitoring events is sufficient to transition to long-term monitoring. Specifically, please clarify whether sufficient time was provided for consumption of the ZVI and ISB amendments on a plume-by-plume basis. In addition, please revise the I-RACR to include resampling to ensure matrix back diffusion, dilution of treatment amendments, changes in water quality parameters, and rebound are sufficiently evaluated.	
3. According to Section 3.9 (Well Decommissioning), Figure 3-10 (Decommissioned Well Locations) shows the locations of decommissioned wells; however, well abandonment logs for several decommissioned wells shown on Figure 3-10 are not included in Appendix G (Well Abandonment Logs) (e.g., IR30MW01F, IR30MW03F, IR29MW72F, IR30MW04F). It should be noted that Table 3-2 (List of Decommissioned Wells) indicates that these wells were previously decommissioned. In addition, Appendix G does not include the California Department of Water Resource Form 188 for these wells or IR30MW02F. Please ensure that all well abandonment logs and forms associated with the decommissioned wells shown on Figure 3-10 are included in Appendix G. Alternatively, a footnote could be added to Figure 3-10 to indicate where Well Abandonment Logs and the California Department of Water Resource forms for these previously decommissioned wells can be found.	Wells IR30MW01F, IR30MW03F, IR30MW04F and IR29MW72F were decommissioned by another contractor prior to conducting this remedial action. Well abandonment logs and DWR forms for these wells are not available at this time. DWR Form 188 for IR30MW02F has been added to Appendix G, to accompany the other DWR forms for wells decommissioned during this RA.
4. While Section 4.1 (Excavation of Contaminated Soil) states that "In the event that LNAPL [light non-aqueous phase liquid] was encountered in an excavation, the product was contained and absorbed using absorbent booms and/or pads before resuming excavation," the text does not discuss the segregation, storage, and/or sampling of soils and/or materials potentially containing high concentrations of oil. According to Section 6.1.3 (Floating Product) of the Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C4, and C5, and Building 241 (Excludes C2), Hunters Point Naval Shipyard, San Francisco, California, dated August 2013 (Final RA WP), "Soils and/or material containing high concentrations of oil will be segregated, stored in appropriate containers or equivalent, and sampled separately to ensure that the waste is correctly characterized prior to disposal by the Navy's HPNS basewide waste transport and disposal contractor." Based on Photograph Nos. 13, 21, and 86 in Appendix F (Photographic Log), floating product was observed in Excavations 22-1 and 10-3. As a result, it is unclear if soils and/or groundwater associated with these excavations were segregated and/or sampled to ensure the waste was correctly characterized prior to disposal. Please revise the I-RACR to clarify how soils and/or groundwater associated with Excavations 22-1 and 10-3 were segregated and/or sampled to ensure the waste was correctly characterized prior to disposal, in accordance with the Final RA WP.	While trace LNAPL was observed within both Excavations 10-3 and 22-1, oil saturated soil was only encountered in Excavation 22-1. In accordance with the Final RAWP, LNAPL observed floating on groundwater was contained and absorbed using absorbent booms and pads prior to resuming excavation. Dewatering was not completed within any of the excavations; therefore, the collection of water samples for waste characterization was not warranted. At Excavation 22-1 where LNAPL-impacted soil was observed just south of Building 231, this soil was stockpiled and managed separately as described in revised Sections 4.1 and 4.1.1.1. Section 4.1 (Excavation of Contaminated Soil), page 4-2, 2nd paragraph, was revised as follows: "During inclement weather, excavation activities were temporarily stopped and BMPs were inspected. The general approach was to allow water to remain in an excavation if water was encountered. Dewatering of excavations (i.e. pumping out groundwater) was not necessary nor performed. Soil excavated below the groundwater surface was separately contained within a bermed and lined stockpile area. Excavation confirmation soil samples located below the groundwater surface were collected using an excavator. In the event that LNAPL was observed floating on the surface of the groundwater within an excavation, the product was contained using booms and removed with absorbent pads before resuming excavation. Soil visibly impacted by LNAPL was segregated, contained within a bermed and lined stockpile area, and sampled separately to ensure that the material was properly characterized prior to disposal by the Navy's HPNS basewide waste transportation and disposal contractor." Section 4.1.1.1, Excavation 22-1, page 4-5, 1st paragraph, was revised as follows: "During Excavation 22-1, groundwater was encountered at approximately 8 feet bgs. LNAPL was observed floating on the groundwater in the excavation just south of Building 231 near former monitoring well IR28MW129A. Heavily weathered LNAPL was observed floating on the groundwater in the excavation just south of Building 231 near former monitoring well IR28MW129A. LNAPL was removed from the excavation using absorbent booms and pads. Excavated LNAPL-impacted soil was segregated and contained separately within a bermed and plastic-lined stockpile area (#10). The LNAPL-impacted soil was sampled separately for characterization and subsequent offsite disposal by the Basewide T&D contractor."
5. The potential displacement of contaminants during ZVI and/or ISB injections is not sufficiently discussed. For example, the Chlorinated Volatile Organic Compounds, Ethene, and Ethane subsection of Section 5.2.5.2 (Plume C1-2) states, "The observed increase in CVOC concentrations during the first post-injection sampling event was likely due to the redistribution of CVOC mass in the subsurface due to the injection process," but does not discuss the potential downgradient displacement of contaminants. This is of particular concern at Plume C1-2 due to the proximity of the plume to the seawall at Dry Dock 2, which is an impermeable barrier. Similarly, surface heaving was observed during several injections (e.g., Plumes C1-1, C1-2, C1-4, C4-1, C5-1, and C5-2); however, information regarding actions taken to reduce and/or prevent	A plotting error was found on draft Figure 5-26a – graph of CVOCs vs. time at Plume C1-2 for in-plume well IR28MW127A. Figure 5-26a has been corrected and no longer shows an increase in 1,2-DCE concentrations in this well on monitoring Day 41. Therefore, the referenced paragraph of Section 5.2.5.2 (Plume C1-2 CVOCs) was deleted and the last paragraph of this section has been revised as follows: "CVOC concentrations increased in upgradient well IR28MW559A after completing the injections (PCE peaked at a concentration of 37 µg/L at Week 2). However, following this temporary increase in PCE, the TCE, 1,2-DCE and VC concentrations were observed to sequentially increase then decrease with a subsequent increase in ethene and ethane concentrations. These results demonstrate that the biodegradation process was going to completion within the treatment area.

surface heaving are not discussed. Please revise the I-RACR to discuss the potential displacement of contaminants due to ZVI and/or ISB injections. In addition, please revise the I-RACR to discuss actions taken to reduce and/or prevent surface heaving observed during injections.	CVOC concentrations remained low in downgradient well IR28MW126A following the injections. CVOC concentrations were below treatment criteria in all wells at the end of the RA performance monitoring period." The following paragraph was added to Section 5.2.3.3, Injection Procedures to discuss actions taken to reduce surface heave: "Surface heave during pressurization of the subsurface is a potential effect of pneumatic fracturing and the injection process. Therefore, injection points inside or outside buildings either were not be installed adjacent to load-bearing structures, or, lower injection pressures were used in these areas to minimize heave and avoid potential building effects. During the injection process, ground surface heave was measured with a surveying transit and a graduated rod. These data were used to adjust the injection pressures, as necessary, and minimize surface heave."
6. Based on Section 6.5.3 (Subsurface Soil Vapor Volatile Organic Compound Concentration Reduction), photoionization detector (PID) measurements were utilized to: (1) evaluate the rate of decline in the system influent and within the well field; and, (2) evaluate changes in the subsurface soil vapor concentrations as a result of soil vapor extraction (SVE) treatment; however, PID measurements at other Hunters Point Naval Shipyard (HPNS) areas were found to have little relationship to analytical laboratory analyses using EPA Methods T0-14 or T0-15 (e.g., IR-10 in Parcel B). As a result, it is unclear if the conclusions drawn solely on PID measurements are appropriate and representative. Further, it is unclear why the EPA Method T0-15 data were not utilized to validate the mass removal calculations provided for the SVE systems. Please revise the I-RACR to clarify why conclusions drawn solely on PID measurements are appropriate and representative given that PID measurements at other HPNS areas were found to have little relationship to analytical laboratory analyses using EPA Methods T0-14 or T0-15. In addition, please revise the I-RACR to clarify why EPA Method T0-15 data was not utilized to validate the mass removal calculations provided for the SVE systems.	For clarification, the following two paragraphs have been added to the end of Section 6.5.3 (Subsurface Soil Vapor Volatile Organic Compound Concentration Reduction) as follows: "PID measurements are commonly used as a cost-effective tool to measure VOCs vapor concentration changes at SVE treatment sites. PID measurements are particularly useful at sites where the primary subsurface contaminants are chlorinated ethenes (e.g. TCE and PCE), such as in the case for the Parcel C SVE areas. Soil vapor samples from select wells were also collected periodically for laboratory analysis using EPA Method TO-15 to validate the vapor concentration changes within each treatment area. The SVE sampling procedures were performed in accordance with the Final SAP (CB&I, 2013) and the Final SVE O&M Plan (CB&I, 2014). The conclusions on overall SVE treatment effectiveness are drawn from PID measurements, in conjunction with the laboratory analytical results of samples collected from select SVE wells and the VOC mass removal determined from the SVE system influent samples and the baseline sample results. EPA Method TO-15 laboratory data were used to calculate VOC mass removal rates from the SVE systems. VOC mass removal calculations were performed using the SVE system influent concentrations (from monthly EPA Method TO-15 analyses) and measured blower extraction rates; the most commonly used method to quantitatively determine the rate and the cumulative amount of VOCs directly removed by an SVE system. SVE system performance monitoring and evaluation, utilizing both PID measurements and laboratory analytical results, were performed as described in the Final SVE O&M Plan (CB&I, 2014)."
7. Figures 6-21 [Volatile Organic Compounds (VOC) Mass Removal at SVE Areas 6 and 7 (Building 231), RU-C1], 6-22 [Volatile Organic Compounds (VOC) Mass Removal at SVE Area 8 (Building 253/211), RU-C1], 6-23 [Volatile Organic Compounds (VOC) Mass Removal at SVE Area 1 (Building 272/281), RU-C4], and 6-24 [Volatile Organic Compounds (VOC) Mass Removal at SVE Area 3, RU-C5] do not indicate that asymptotic conditions were achieved. For example, Figure 6-24 appears to flattening at the end of the monitoring prior due to system shutoff for maintenance and accommodation of groundwater injection activities near SVE Area 3 but it does not appear that asymptotic conditions were achieved. Similarly, Section 9.3 (Effectiveness of Soil Vapor Extraction Remedy) does not discuss whether asymptotic conditions were achieved or why the systems were shutdown prior to achieving asymptotic conditions. Please revise Figures 6-21 through 6-24 to indicate that asymptotic conditions were achieved. In addition, please ensure the I-RACR discusses whether asymptotic conditions were achieved and why the systems were shutdown prior to achieving asymptotic conditions.	Reaching an asymptotic level for VOC mass removal does not by itself indicate that SVE has accomplished the treatment objective for the site. Achieving an asymptote merely indicates that the mass removal has decreased to a relatively constant rate. Typically, optimization will be conducted at this point to determine if further mass removal could be achieved through operational adjustments to the SVE system or well field. A more direct measurement of SVE effectiveness is to determine its potential to meet the primary goal as described in the ROD and RD, which is to achieve VOC source reduction within the treatment areas, with an ultimate remedial action objective (RAO) to "prevent or minimize exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors." Hence, Section 9.3 discusses the SVE remedy effectiveness based on the potential of the meeting the ROD treatment goal at each site, and not on achieving a mass removal asymptote. Figures 6-21 through 6-24 show the SVE treatment progress (i.e. VOC mass removal) during the specified operational period and are not intended to indicate that the SVE system operations have reached the point (e.g., asymptotic conditions) to recommend complete shutdown. Please note that this I-RACR is not requesting approval to terminate operation of the SVE systems. Section 10.1.3 states: "Additional SVE treatment activities are being performed by another Navy contractor under the next phase of work and those results will be reported in a separate remedial action completion report." The final RACR will discuss when asymptotic and/or shutdown conditions are achieved for each SVE area. Therefore, no changes to the figures or the text in Section 9.3 are necessary.
Specific Comments	**Response**
1. **Section 2.2.3, Treatability Studies, Pages 2-6 to 2-8:** Section 2.2.3 discusses the past treatability studies at Parcel C including remediation of VOCs in groundwater using chemical oxidation, ZVI injection, and anaerobic-aerobic bioremediation techniques; however, Section 2.2.3 does not [indicate] whether rebound occurred or was evaluated during	Section 2.2.3 summarizes background information from earlier reports for the reader's benefit and is not intended to reanalyze the older data previously submitted. Data from these past treatability studies at Parcel C were evaluated and used to select the remedy presented in the ROD (Navy, 2010). Therefore, section 2.2.3 will not be revised. Section 5.0 presents and evaluates the newer groundwater data, including for potential rebound, collected during this RA.

these treatability studies. Please revise Section 2.2.3 to discuss whether rebound occurred or was evaluated during these treatability studies.	
2. **Section 4.1, Excavation of Contaminated Soil, Page 4-1:** Section 4.1 indicates that when underground piping or utilities were encountered within an excavation footprint, the items were assessed, removed if practical, segregated, and temporarily stockpiled; however, the text does not discuss the actions that were taken if removal of the underground piping or utilities was not practical. For example, Section 4.1.1.1 (Excavation 22-1) indicates that adjacent to the buried crane rail system within Excavation 22-1, a masonry vault was uncovered and left in place. However, details regarding how this vault was left in place are not provided and/or referenced. Please revise the I-RACR to discuss the actions that were taken if removal of the underground piping or utilities was not practical.	Section 4.1, page 4-1, has been revised as follows: "When underground piping or utilities were encountered within an excavation footprint, the items were assessed, removed if practical, segregated, and temporarily stockpiled. All piping and utilities encountered were inactive. In the event that piping or utilities could not be practically removed, the item was inspected by the Construction Manager to confirm it was not an ongoing source of contamination, soil was excavated from around the object to the extent practical within the excavation footprint, and confirmation sampling was performed to document that residual soil concentrations were less than action levels. Specific removal activities conducted at each excavation are discussed in detail by RU in Sections 4.1.1 through 4.1.4. ." In addition, Section 4.1.1.1 (Excavation 22-1) has been revised as follows: "During excavation, several abandoned utility corridors and underground pipes were uncovered spanning the width of the excavation (Figure 4-3). The smaller pipes that could be cut were removed prior to further excavation. All pipes that were removed were previously abandoned lines and did not have an effect on the infrastructure of the base. Piping that was left in place was inspected and determined not to be a source of contamination by the Construction Manager." "The concrete utility corridors that were exposed were, for the most part, left in place; the more dilapidated sections were broken up and removed. Along the northern end of Excavation 22-1 near Dry Dock 2, a buried crane rail system was uncovered and left in place. Adjacent to the rail system, a masonry utility vault (Figure 4-3) was uncovered within the excavation and was also left in place. These former concrete/masonry structures were inspected and determined not to be sources of contamination. Soil around and supporting these structures was removed to extent practical within the excavation footprint without jeopardizing the stability of the structures. Due to the large size of these concrete structures within the excavation, confirmation sample locations were adjusted as needed either to the left or right of the structure. All final confirmation samples collected in close proximity to these structures contained concentrations below RGs and/or met RAOs. Figure 4-3 of Excavation 22-1 shows the left-in-place concrete/masonry structures as well as the surrounding final confirmation sample locations.."
3. **Section 4.1.1.1, Excavation 22-1, Pages 4-3 to 4-5:** Based on Section 6.1.3 (Floating Product) of the Final RAWP, LNAPL within well IR28MW129A will pumped with a peristaltic pump or equivalent prior to the abandonment of the well; however, details regarding this project removal, beyond a footnote on Table 3-2 (List of Decommissioned Wells), are not provided and/or referenced. Please revise Section 4.1.1.1 to discuss the removal of LNAPL within well IR28MW129A prior to the abandonment of well IR28MW129A.	The following sentence has been added to Section 4.1.1.1: "Trace LNAPL and water were removed from well IR28MW129A with a peristaltic pump prior to well decommissioning."
4. **Section 4.1.2.1, Excavation 23-1, Page 4-7:** The text indicates that sample results high in manganese (i.e., 23-1G-B01, 23-1G-SW01, and 23-1G-SW03) were encountered from Excavation 23-1 and that it was determined that the manganese levels were naturally occurring in the bedrock; however, information to substantiate this conclusion are not provided and/or referenced. Please revise Section 4.1.2.1 to provide and/or reference information to substantiate that the sample results high in manganese are naturally occurring in the bedrock encountered at Excavation 23-1.	Section 4.1.2.1, page 4-7 provides the following references: Tetra Tech EMI, Inc. (TtEMI), 2001a, *Calculation and Implementation of Supplemental Manganese Ambient Levels, Hunters Point Shipyard, San Francisco, California*, February 28; and Innovative Technical Solutions, Inc. and Tetra Tech Inc. (ITSI and Tetra Tech, Inc.), 2004, *Draft Metals Concentrations in Franciscan Bedrock Outcrops, Hunters Point Shipyard, San Francisco, California.* March 17. Section 4.1.2.1 was also revised as follows: "Bedrock was prevalent in many of the RU-C4 excavations, including Excavation 23-1, with its associated naturally occurring metals (TtEMI, 2001a; ITSI and Tetra Tech, Inc., 2004). Several locations after excavation did not warrant over-excavation due to the presence of bedrock, which varied in depth across this excavation, occurring as shallow as 2 feet bgs. At these locations, the soil samples that could be collected had results high in manganese (e.g., 23-1G-B01, 23-1G-SW01, and 23-1G-SW03) which were determined to be naturally occurring in the bedrock at this location (TtEMI, 2001a)."
5. **Section 4.1.2.1, Excavation 23-1, Pages 4-6 to 4-8 and Figure 4-5, Excavation Area 23-1 and Section 4.1.2.4, Excavation 24-1, Pages 4-9 to 4-10 and Figure 4-8, Excavation Area 24-1:** Based on Figure 4-5, two confirmation samples (23-1D-SW06- 7' and 23-1 C-SW02-3 ') that were left in place due to encountering the foundation of Building 203 had mercury detections above the ROD Residential Remediation Goal and the Tier 1 Remedial Action Level; however, Section 4.1.2.1 does not discuss the potential for mercury vapor intrusion (VI) at Building 203. Similarly, Figure 4-8 (Excavation Area 24-1) indicates that mercury was detected above the ROD Residential Remediation Goal and the Tier 1 Remedial Action Level in an excavation bottom sample location adjacent to Building 271 (24-1-B04-12 '); yet, Section	The following paragraph has been added to Section 4.1.2.1 (Excavation 23-1): "As shown on Figure 4-5, two confirmation samples (23-1D-SW06-7' and 23-1C-SW02-3') that were left in place due to encountering the Building 203 foundation had mercury detections above the Tier 1 Remedial Action Level. Soil excavation was completed up to the perimeter of the building in accordance with the RAWP. However, the potential for mercury vapor intrusion (VI) within Building 203 may be evaluated during future review of available site data and soil gas sampling to determine the Parcel C Areas Requiring Institutional Controls (ARICs) at Building 203."

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Comments by: Judy Huang, Remedial Project Manager, EPA, comments dated April 17, 2017	
4.1.2.4 (Excavation 24-1) does not discuss the potential for mercury vapor intrusion at Building 271. Please revise the I-RACR to acknowledge the potential for mercury VI and to recommend that this potential be evaluated during the future sampling to determine the Parcel C Areas Requiring Institutional Controls (ARICs) at Buildings 203 and 271, given the adjacent exceedances of mercury cleanup levels.	Similarly, the following paragraph has been added to Section 4.1.2.4 (Excavation 24-1): "As shown on Figure 4-8, one bottom confirmation sample (24-1-B04-12') that was left in place due to encountering bedrock had a mercury detection above the Tier 3 Remedial Action Level. Soil excavation was completed down to bedrock and up to the perimeter of the building in accordance with the RAWP. However, the potential for mercury VI within Building 271 may be evaluated during future review of available site data and soil gas sampling to determine the Parcel C ARICs at Building 271." In addition, the following sentence has been added to Section 10.2.1 (recommendations for soil excavation areas): "As discussed in Sections 4.1.2.1 and 4.1.2.4, the potential for mercury VI within Buildings 203 and 271 may be evaluated during future review of available site data and soil gas sampling to determine the Parcel C ARICs at these two buildings."
6. Section 4.2, Underground Storage Tank Closure, Page 4-24: The text states, "In both SVE wells IR28V4-07A and IR28V4-08A, the February 2016 soil vapor VOC concentrations measured with a PID were reduced to below the detection limit (Figure 6- 30); demonstrating successful treatment of CVOCs in soil/soil vapor in the area of the former USTs;" however, information other than the PID measurements (e.g., T0-15 data) is not provided to substantiate this conclusion. Further, Section 4.2 does not discuss how rebound was evaluated using PID measurements to determine successful treatment of CVOCs in soil/soil vapor in the area of the former USTs. Please revise Section 4.2 to present information to substantiate the PID measurements that CVOCs were successfully treated in soil/soil vapor in the area of the former USTs. In addition, please revise Section 4.2 to discuss how rebound was evaluated using PID measurements to determine successful treatment of CVOCs in soil/soil vapor in the area of the former USTs.	Section 4.2, page 4-25, has been revised as follows to substantiate the PID measurements and demonstrate effective treatment of VOCs in the UST area: "Several rounds of PID readings were collected at SVE wells IR28V4-07A and IR28V4-08A adjacent to former USTs HPA-33 and HPA-34 between October 2014 and February 2016. As shown on Figure 6-30, these PID readings ranged between 0.0 and 0.2 ppm indicating successful VOC treatment in the former UST area. In addition, the closest SVE Area 1 performance monitoring well IR28SG539, located 30 feet from both USTs HPA-33 and HPA-34, was sampled between October 2014 and September 2015 for VOCs using EPA Method TO-15 (Table 6-16 and Figure 6-30). These laboratory data show that TCE concentrations in soil gas samples were reduced from 4,400 to 2,400 µg/m³ and cis-1,2-DCE was reduced from 690 to 93 µg/m³ between October 2014 and September 2015. These soil vapor data, along with the groundwater performance sampling results discussed above (Figure 5-39), demonstrate that residual solvent contamination in the vicinity of HPA-33 and HPA-34 was effectively remediated and, therefore, closure of these two former solvent tanks is recommended." Further SVE evaluation will be completed during the next phase of RA.
7. Section 5.2.1, Remediation Performance Monitoring Well Installation (2013), Page 5-9: Section 5.2.1 states, "Newly installed monitoring wells were sampled no sooner than 48 hours after well development to allow for aquifer conditions to equilibrate;" however, it is unclear that sampling 48 hours after development was appropriate for equilibration with the aquifer. Generally, one to two weeks is required for equilibration to occur and more time may be required for wells completed in fine-grained materials. Please revise Section 5.2.1 to clarify why sampling 48 hours after development was appropriate for equilibration with the aquifer.	Sampling "no sooner than 48 hours after well development" is an accepted groundwater monitoring procedure that was specified in the Final Parcel C Remedial Action Work Plan, Section 8.1, Remedial Action Groundwater Monitoring Well Installation, Surveying, Development, and Sampling (CB&I, 2013). Section 5.2.1, last paragraph, has been revised to reference the Final RAWP as follows: "Newly installed monitoring wells were sampled no sooner than 48 hours after well development to allow for aquifer conditions to equilibrate in accordance with the Final RAWP (CB&I, 2013)."
8. Section 5.2.5.5, Plume C5-1, Page 5-29 and Figure 5-41a, Dissolved Oxygen (DO) Versus Time at Plume CS-1 Monitoring Wells: Figure 5-41a indicates that a low dissolved oxygen (DO) concentration was not maintained at IR06MW22A, but does not discuss this occurrence in Section 5.2.5.5. As such, it is unclear if reductive dechlorination occurred at the end of the monitoring period. While Section 5.2.5.5 discusses the establishment of suitable conditions, please ensure that Section 5.2.5.5 is revised to discuss conditions at the end of the monitoring period.	The following sentences have been added to the Plume C5-1 ORP/DO Section 5.2.5.5, page 5-29: "DO levels subsequently increased during the monitoring period, with DO exceeding 1 mg/L in all Plume C5-1 monitoring wells by September 2014 (Day 148). By the end of the monitoring period (March 2015/Day 315), DO levels increased to 12.66 mg/L and 4.1 mg/L in in-plume wells IR06MW22A and IR06MW59A1, respectively, while ORP levels remained less than -70 mV. These elevated DO levels (above 1 mg/L) indicate that anaerobic conditions conducive to complete CVOC bioremediation were not maintained in the treatment area by the end of the monitoring period."
9. Section 6.4.2.1, Remedial Unit-Cl/Soil Vapor Extraction Areas 6 and 7, Pages 6-16 and 6-17: Section 6.4.2.1 states, "The highest PID reading was recorded on March 18, 2015, at the soil-gas monitoring point IR28SG561, located in the eastern end of SVE Area 7. This reading is considered an anomaly since there were no other PID readings recorded over 2 ppmv [parts per million per volume] other than this elevated detection on March 18, 2015;" however, no additional sampling was conducted to address this apparent anomaly. Similarly, the text states, "The only substantial VOC increase (from 0.3 to 15.8 ppmv by PID) was recorded at VM [vapor monitoring] well IR28SG628, located at the northeastern corner of SVE Area 6. This PID detection is suspected to be an anomaly, as VOCs [volatile organic compounds] had not been detected above 10 ppmv since monitoring began in April 2015" yet, no additional sampling was conducted to address this apparent anomaly. Typically, when anomalies are observed, measurements are repeated to ensure the concentrations can be verified. Please revise Section 6.4.2.1 to clarify how these apparent anomalies will be verified and/or addressed given the lack of confirmation sampling.	Normally, a suspected anomalous PID reading would be verified as soon as possible with an additional measurement, an alternate PID, or during a subsequent weekly monitoring visit as was the case for the PID reading recorded on March 18, 2015 at soil-gas monitoring point IR28SG561. However, in the case of the elevated PID reading recorded on February 9, 2016 at VM well IR28SG628, it could not be verified because the SVE system was temporarily shut down later that day as the SVE operation was transferred to the next Navy RA contractor. In the future, any suspected anomalous PID readings will be verified as soon as possible with subsequent readings.
10. Section 6.5.3.2, Remedial Unit-Cl/Soil Vapor Extraction Area 8, Page 6-29 and Figure 6-28, Soil Vapor VOC Concentration Changes during SVE Treatment at Area 8: Based on Figure 6-28, the TCE concentration at IR28SG590 increased from 780 micrograms per cubic meter (ug/m3) (After 2 Months) to 1,400 ug/m3 (After 17 Months); however, Section 6.5.3.2 does not discuss why the TCE concentration in IR28SG590 increased. Also, it is unclear from Section 6.5.3.2 whether the TCE concentration in IR28SG590 will be evaluated in a follow-on contract. Please revise Section	A statement about the potential source of VOC rebound in the soil vapor at IR28SG590 was already included in Section 6.5.3.2, beginning with "Both locations suggest the presence of residual VOC source material in the area". Nevertheless, the last paragraph of Section 6.5.3.2 has been revised as follows: "TCE vapor concentrations appeared to show rebound at IR28SG590, increasing from 780 µg/m³ in October 2014 to 1,400 µg/m³ in September 2015, while continuing to gradually decrease at IR28SG617. Both locations suggest the presence of residual VOC source material in the area that continues to diffuse into the vadose zone. These areas include the former concrete sumps located near well IR28SG427 inside Building 253, and the location

6.5.3.2 to discuss the TCE concentration increase in IR28SG590 between the 2 month and 17 month measurements. In addition, please ensure that the TCE concentration in IR28SG590 will be evaluated in a follow-on contract.	near the VM well IR26SG630 inside Building 211 where a vapor concentration rebound was noted at the end of the SVE system operation period. <u>These areas near IR28SG427, IR28SG590, and IR26SG630 will be evaluated and treated further by continued SVE operation and monitoring, as needed, pending further planned RA in this area and as recommended in Section 10.2.3.2.</u>"
11. Section 6.5.3.3, Remedial Unit-C4/Soil Vapor Extraction Area 1, Pages 6-30 to 6-31 and Figure 6-30, Soil Vapor VOC Concentration Changes During SVE Treatment at Area 1: Based on Figure 6-30, several VOC concentrations remain elevated following 17 months of SVE treatment at Area 1 (e.g., IR28SG539, IR28SG534), but Section 6.5.3.3 makes no commitment to evaluate these VOC concentrations in a follow-on contract. This is of particular concern given the likelihood of rebound to occur. Please revise Section 6.5.3.3 to ensure that VOC concentrations in Area 1 are evaluated during the follow-on contract.	The following sentences have been added to the second last paragraph of Section 6.5.3.3: "The September 2015 TCE concentrations at soil gas wells IR28SG534 (960 $\mu g/m^3$) and IR28SG539 (2,400 $\mu g/m^3$) exceeded the SGAL (659 $\mu g/m^3$). Although, PID measurements from nearby SVE wells collected in February 2016, after 17 months of SVE treatment (Figure 6-30), showed soil vapor readings below the PID detection limit, further SVE evaluation is recommended and discussed in Section 10.2.3.3."
12. Section 7.1, Soil and Construction Debris, Pages 7-1 to 7-3 and Table 4-23, Soil Stockpile Summary for Parcel C: Based on Table 4-23, Stockpiles 1, 4, 6, 7, 8, 9, and 12 included soils from multiple excavations; however, Section 7.1 does not discuss the initial segregation of soils from different sources or the assessment of the soils prior to combining soils from different sources. According to Section 3.1 (Waste Accumulation and Storage) of Appendix D (Final Waste Management Plan) of the Final RA WP, "The Site Superintendent will ensure wastes from different sources are additionally segregated by each individual source. The T &D [Transportation and Disposal] Coordinator will then review available information and determine whether the wastes from different sources can be commingled for both cost and handling efficiency." Please revise Section 7.1 to discuss how the soils were initially segregated and then combined in accordance with the Final RA WP.	Section 7.1 has been clarified with the addition of a new paragraph on page 7-1 as follows: "Excavated materials from different source areas with dissimilar contaminants (e.g. metals versus VOCs) were initially segregated and stockpiled separately for waste characterization purposes. Excavated soils with similar COCs were combined into one or more stockpiles on site when practical. The consolidation of similar material excavated on site limited the number of stockpile areas and space required, while avoiding the potential comingling of different waste types to be transported offsite. In the case of Excavation 22-1, where soil was visually impacted with LNAPL within a portion of the excavation, that material was also segregated and stockpiled separately for characterization and offsite disposal."
13. Section 7.1, Soil and Construction Debris, Page 7-2: Section 7.1 states, "On September 27, 2013, during excavation activities at Excavation 23-1, material that appeared to be grit blast from prior ship cleaning activities was encountered;" however, the text does not clarify why the material was suspected of being grit blast. For example, it is unclear if paint chips were observed in the material implying that it was used grit blast. Please revise Section 7.1 to provide additional details regarding how the suspected grit blast was identified.	Section 7.1 has been <u>revised</u> on page 7-2 as follows: "On September 27, 2013 during excavation activities at Excavation 23-1, material that appeared to be grit blast from prior ship cleaning activities was encountered. <u>The material was verified as grit blast based on grain size, color and personal experience by the construction manager and SSHO. The grit blast material was located in one area of Excavation 23-1, and appeared coarse and grey in color, which varied from the other light brown soil present.</u> Excavation activities were temporarily stopped at this location and the grit blast material was sampled separately to verify that it was not radiologically impacted."
14. Section 7.1, Soil and Construction Debris, Page 7-2: It is unclear how it was determined that reused concrete was "clean." Section 7.1 indicates that clean concrete that was removed as part of the excavation activities was reused onsite (e.g., bridging material in deeper excavations with standing groundwater). However, details regarding the sampling and analysis of the concrete (e.g., discrete or wipe samples) to confirm the concrete was clean are not provided and/or referenced. Please revise Section 7.1 to provide and/or reference information to substantiate that the concrete was clean prior to reuse onsite.	Section 7.1 on page 7-3 has been <u>revised</u> as follows: "<u>Concrete that was removed as part of the remedial excavation activities was stockpiled and visually inspected for contamination (i.e. staining) to determine if the material was suitable for reuse on site. Concrete reuse was evaluated to reduce the environmental footprint of the Parcel C remedial action project as well as eliminate disposal costs for clean concrete. Unstained concrete was determined to be clean and suitable for project reuse. The clean concrete was sized on site, rebar was removed from the concrete pieces, and the crushed concrete was used as bridging material along with imported rock in deeper excavations with standing groundwater.</u> Approximately 300 cy of concrete were reused on site as bridging material after receiving concurrence from the California Regional Water Quality Control Board—San Francisco Bay Region (refer to FWV #004 and the associated California Regional Water Quality Control Board—San Francisco Bay Region email in Appendix A)."
15. Section 7.6, Wastewater, Page 7-5: Several of the photographs in Appendix F (Photographic Log) show excavations containing water (e.g., Photograph Nos. 13, 15, 18, 19, 21, 23, 24, 34, 35, 42, 43, 66, 68), but Section 7.6 does not discuss whether dewatering was conducted. If dewatering did occur, details regarding how water was containerized, sampled, analyzed, and disposed are not provided and/or referenced. Please revise Section 7.6 to clarify whether dewatering of the excavations containing water occurred. If dewatering did occur, please revise the I-RACR to include details regarding the containerization, sampling, analysis, and disposal of the water.	The following sentence has been added to Section 7.6 for clarity: "Dewatering activities were not necessary nor conducted during remedial excavations, as described in Section 4.1 and 4.5, to minimize wastewater generation."
16. Section 9.2, Effectiveness of the Groundwater Remedy, Pages 9-2 to 9-3: Section 9.2 does not consider rebound. Resampling is merited to evaluate whether rebound has occurred. Please revise the Draft I-RACR to discuss the potential for rebound and identify the plumes where rebound could occur.	The following sentences have been added to the end of Section 9.2 for clarity: "Recommendations and on-going activities for each plume area, including continued groundwater monitoring and/or additional planned RA, are presented in Section 10.2.2. The Navy will continue to conduct regular groundwater monitoring, including for potential rebound at all Parcel C groundwater plumes identified in the ROD, under the Basewide Groundwater Monitoring Program to monitor the long term effectiveness of the remedy (Trevet, 2017)."
17. Figure 4-7, Excavation Area 23-3: The depth of Excavation Area 23-3 is not provided and/or referenced on Figure 4-7. As a result, the depth at which bedrock was encountered is not clearly defined as no bottom confirmation sample was collected.	Figure 4-7 was revised, and other excavation figures where necessary, to show the excavation and bedrock depths (i.e. bottom confirmation sample depths). Section 4.1.2.3 (Excavation 23-3) has also been <u>revised</u> as follows: "<u>Shallow bedrock was encountered in the planned excavation area (SulTech, 2008) during confirmation sampling between 0 and 6 feet below grade.</u>

It should be noted that Section 4.1.2.3 (Excavation 23-3) does not indicate the depth at which bedrock was encountered. Please revise all excavation figures provided in the IRACR to specify the approximate depths of each excavation area.	No bottom confirmation sample was able to be collected in the center of the excavation as bedrock was encountered at grade level. Confirmation sample locations and depths are shown on Figure 4-7 and sample results are presented in Table 4-6."
18. Figure 4-18, Excavation Area 11-1: It is unclear why excavation sidewall sample location 11-1-SW04 is located approximately 10 feet beyond the excavation area. Please revise Figure 4-18 to clarify why the excavation sidewall sample location is located approximately 10 feet beyond the excavation area.	After reviewing the original excavation sampling field notes for verification, Figure 4-8 (Excavation 11-1) was revised to locate confirmation sample 11-1-SW04 on the planned excavation boundary consistent with actual field conditions.
19. Figure 6-16, Vapor Concentrations Measured using Photoionization Detector (PID) at Vapor Monitoring Wells/Soil Gas Probes at SVE Area 1- Building 272/281, RUC4: The scale of Figure 6-16 is not suitable for the data. As a result, the vapor concentrations measured at SVE Area 1 cannot be distinguished and evaluated. It may be necessary to include wells with lower concentrations on a separate figure. Please revise Figure 6-16 to ensure the vapor concentrations measured at all SVE Area 1 wells are readable or provide another figure that includes wells with lower concentrations.	Figure 6-16 has been revised and made into two figures (6-16a and 6-16b) with appropriate scales to show the concentration fluctuations observed at vapor monitoring wells across SVE Area 1 during SVE system operations.
20. Appendix F, Photographic Log, Photograph No.8: Photograph No.8 shows the upwind air monitoring station and generator, but a photograph of the downwind air monitoring station and generator is not provided. Please revise the I-RACR to include a photograph of the downwind monitoring station and generator, if available.	A photograph of the downwind air monitoring station and generator was not taken and therefore is not available to include in Appendix F. The locations of the downwind air monitoring station are shown on Figure 1 of the Air Monitoring Report (Appendix I).
21. Appendix F, Photographic Log, Photograph No. 40: Photograph No. 40 shows contaminated soil being loaded into a dump truck for relocation to a stockpile area; however, Section 6.1 (Excavation) of the Final RA WP indicates that plastic sheeting will be used in areas of underlying clean soil to minimize risk from cross contamination during placement of excavated soil into haul trucks. Please revise the I-RACR to clarify why plastic sheeting was not utilized during the loading of excavated soil into haul trucks.	The referenced statement from Section 6.1 (2nd paragraph) of the Final RAWP about using "plastic sheeting in areas of underlying clean soil to minimize the risk for cross contamination" was intended to apply to soil handling activities in clean areas, such as soil stockpile areas. Plastic sheeting was not necessary during truck loading operations as the trucks were loaded in previously contaminated excavation areas (which were subsequently sampled) or the truck loading area was asphalt covered. Plastic sheeting was used to construct soil stockpile areas to prevent potential cross contamination to underlying soil. Section 4.1.6 (Construction Debris and Stockpile Management) presents an in-depth discussion of how stockpiles were constructed including the use of liner material. Therefore, no revisions were made to the text.
22. Appendix L, Compaction Testing Summaries, Report 01 - Compaction Inspection Report for Imported Soil from Borrow Site: The Daily Inspection Report for August 26, 2013 is blank, but an explanation is not provided in the I-RACR to clarify why this report is blank. It should be noted that Section 4.3 .1 (Building 281 Solvent Line) indicates that the former solvent line excavation area outside Building 281 was backfilled and the surface area restored on August 26, 2013. Please provide the missing information or revise the I-RACR to clarify why the Daily Inspection Report for August 26, 2013 is blank.	The Daily Compaction/Inspection Report for August 26, 2013 (Appendix L, Report 01) is not blank. On this day, Smith Emery (the compaction/materials testing subcontractor) picked up two 5-gallon buckets of backfill material (brown sand) from the borrow source and delivered the material to the laboratory for compaction testing as indicated in the report notes by Mr. Reeves (second page of Report 01).
23. Appendix L, Compaction Testing Summaries, Report 06- Compaction Testing Results for Excavation 24-1 and Report 07- Compaction Testing Results for SVE Area 3 Trench: The April 17, 2014 and February 12, 2016 Daily Compaction Test Reports indicates that the relative density compaction specification is 95 percent; however, information to support this criterion is not provided and/or referenced. It should be noted that Section 6.3 (Backfill Placement and Compaction Testing) of the Final RA WP discusses compaction of soil to 90 percent relative density but not 95 percent. Please revise the I-RACR to clarify why this relative density compaction specification was utilized at these two excavations and not elsewhere.	The required compaction level for excavation backfill for areas to be covered by permanent roadways was 90 percent relative density. For Excavation 24-1 (addressed in Compaction Report 06), this area had a required compaction of 90 percent relative density. Report 06 indicates that there may have been a miscommunication in the field regarding the potential need to achieve 95% relative compaction; however, testing results (96.0 and 97.2%) exceeded the required 90% compaction specification. Therefore, no edits are necessary. A higher level of compaction (95%) was voluntarily utilized for the SVE Area 3 trench which crossed active Lockwood Street near Building 134. Therefore, the last paragraph of Section 4.5 - Excavation Backfilling, Compaction and Grading was revised as follows: "In areas to be covered by permanent roadways, the soil backfill was compacted to 90 percent relative density as measured by the ASTM D698 compaction characteristics test method. In one case, a higher level of compaction (95% relative density) was voluntarily utilized to avoid potential settlement of an active roadway. At the SVE Area 3 where a trench contained underground SVE piping and crossed Lockwood Street near Building 134 (Figure 6-4), the trench backfill was compacted to 95% relative density. Compaction was verified through compaction testing completed by an independent soil testing firm (Smith-Emery of San Francisco, California) in accordance with the Final RAWP (CB&I, 2013)."